

REMARKS

Claims 1-8, 12-18 and 22 are pending in the application and stand rejected.

Claim Rejections - 35 U.S.C. § 103(a)

Claim 1-3, 6-8, 12, 13, 16-18 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Spaulding et al. (US 5,822,451) in combination with Shu et al. (US 5,768,411).

Claim 1 recites, *inter alia*, an address generator that receives a pixel in an image intended for halftoning and generates an address corresponding to a position of the pixel in a mask memory storing mask threshold values for one color channel;

a mask generator that receives a respective stored mask threshold value corresponding to the address from the mask memory and generates respective mask threshold values for each of a plurality of color channels based on said received respective stored mask threshold value;

a comparison unit that sequentially receives the respective mask threshold value generated for each of the plurality of color channels and a pixel value in the image intended for halftoning, compares both values with each other, and outputs a bilevel value according to a predetermined rule.

In the rejection, the Examiner contends Spaulding discloses most of the features recited in claim 1. (*See* Office Action, pp. 3-4). However, the Examiner concedes Spaulding fails to disclose generation of respective mask threshold values for each of a plurality of color channels “based on said received respective stored mask threshold value,” as recited in claim 1. Applicant

agrees that Spaulding is deficient in this regard. In fact, Applicant submits that Spaulding is further deficient and fails to disclose *“a mask generator that receives a respective stored mask threshold value corresponding to the address from the mask memory and generates respective mask threshold values for each of a plurality of color channels based on said received respective stored mask threshold value,”* as recited in claim 1.

To compensate for this deficiency, the Examiner contends:

Shu discloses a mask generator comprising: a mask information input unit that receives mask information for one color channel generated by a predetermined algorithm (reference dither matrix (cyan) shown in Fig. 3A); an offset calculator that calculates a predetermined offset (fractions of pixel component value range determined (column 5, lines 33-47)); and a mask calculator that calculates masks for a plurality of channels using information on the predetermined offset calculated by the offset calculator (magenta and yellow matrices generated by adding fractions of pixel component range to corresponding values of cyan matrix (column 5, lines 33-47)). Clearly, respective mask threshold values for each of a plurality of color channels (magenta and yellow) are generated, based on a received respective stored mask (cyan matrix) threshold value. This enables production of separate threshold values for each color without the need to provide storage of the threshold values in separate dither matrices for each color, thereby reducing memory requirements for the apparatus.

(Office Action, p. 4).

However, Applicants submit that the Examiner has misconstrued Shu's disclosure. First, “[a] prior art reference must be considered in its entirety, i.e. as a whole. (MPEP § 2141.03 (VI)(citing *W.L. Gore & Associates, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983)). While Shu may disclose how the various different dither matrices (D_C , D_M , D_Y) are selected or derived (*see* col. 5, lines 3-47), Shu fails to disclose or fairly suggest this process is performed within the apparatus for halftoning a color image. Rather, Shu discloses the following apparatus:

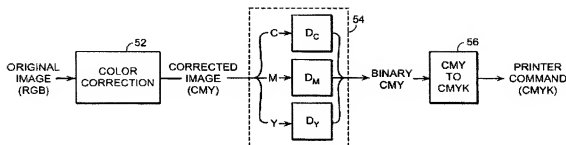


FIG. 7

Consequently, as shown in FIG. 7, the separate matrices have already been selected for each of the color components C, M and Y. Moreover, Shu expressly discloses that “the printer can be operated in a manner that is conventional except for the fact that different color components are dithered by different matrices.” (col. 5, lines 63-64). Further, Shu discloses that FIG. 7 depicts a typical way to implement the invention. (col. 6, lines 3-4). Thus, Shu fails to disclose generating these matrices within the print apparatus.

Accordingly, Shu only fairly teaches of using different color matrices for dithering different color components, and the relationship between these different matrices. However, Shu fails to disclose or even fairly suggest, a mask generator that generates respective mask threshold values for each of a plurality of color channels based on a received respective stored mask threshold value, wherein the mask generator is within an apparatus for halftoning which also comprises an address generator that receives a pixel in an image intended for halftoning. Rather, Shu merely discloses a preferred relationship for generating the matrices (D_C , D_M , D_Y) - independent of an apparatus for halftoning an image. As illustrated in the apparatus for dithering in Shu (FIG. 7), the matrices are already generated.

In this way, the Examiner's reason to combine alleging Shu "enables production of separate threshold values for each color without the need to provide storage of the threshold values in separate dither matrices for each color," is unsupported. Rather, based on the configuration disclosed in Shu, these matrices are merely predetermined based on a specific relationship, and are, in fact, stored in a memory.

In this way, even if Shu and Spaulding are combined as suggested, Applicant submits this combination fails to disclose:

- (1) generating an address corresponding to a position of the pixel in a mask memory storing mask threshold values for one color; and
- (2) a mask generator that receives a respective stored mask threshold corresponding to the address and generating respective mask threshold values for each of a plurality of color channels based on the received stored mask threshold value for the one color.

Consequently, because Shu merely discloses using different matrices to dither each different color component as well as a relationship between these matrices so that different colors tend to print in different locations: (1) Shu fails to compensate for the deficiencies of Spaulding; and (2) Shu fails to recognize or address the problem of excess memory requirements resulting from the different matrices used. It is in this way that Shu actually adds to the memory requirements of the printing apparatus.

Thus, Applicant submits that even if combined as suggested, the applied combination fails to disclose all the features recited in claim 1. Additionally, because claims 1, 12 and 22 recite similar features, Applicant submits these claims are allowable for the same reasons set forth above with regard to claim 1. Finally, Applicant submits claims 2-3, 6-8, 13 and 16-18 are allowable, at least by virtue of their dependency.

Claim Rejections - 35 U.S.C. § 103(a)

Claims 4, 5, 14 and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Spaulding in view of Shu, in further view of Young et al. (US 6,154,195).

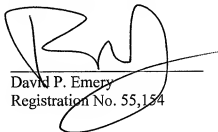
In response to this rejection, Applicant submits that because Young, either taken alone or in combination with Spaulding and Shu, fails to compensate for the above noted deficiencies of the Spaulding/Shu combination as set forth above, claims 4, 5 14 and 15 are allowable, at least by virtue of their dependencies.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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